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Fetal Growth in Twin Pregnancies

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Abstract. In 65 consecutive twin pregnancies, 722 measurement of fetal abdominal circumference have been obtained with ultrasound. Zygosity was established after delivery in 85% of the pregnancies. There was no difference in mean abdominal circumference measurements between monozygotic and dizygotic pregnancies. In both groups, the pattern of growth was linear throughout pregnancy in contrast to that predicted by birthweight for gestational age charts. It is suggested that increasing trunk flexion, in later twin pregnancy, may distort accurate abdominal circumference measurement.

Key words: Twin pregnancy, Zygosity, Ultrasound, Fetal growth

INTRODUCTION

Fetal growth retardation makes an important contribution to the high perinatal mortality rate associated with twin pregnancy [6]. Small-for-gestational age (SGA) is the most commonly used index of poor intrauterine growth and there has been debate for some years about whether singleton [4] or specific twin [7,10] criteria should be employed to classify SGA twin neonates. It is recognised that, in singleton pregnancies, the failure of a fetus to achieve its intrinsic growth potential, due to poor nutritional support, is accompanied by increased risk of various perinatal problems, including death. There is no reason why a difference should exist in growth potential between singleton fetuses and dizygotic (DZ) twins and it therefore seems appropriate to apply singleton definitions of SGA to this group. Because of the unusual features which surround the genesis of monozygotic (MZ) twinning, however, growth potential in these babies may be different from that of fetuses which uniquely result from a single ovum, whether DZ twins or singletons. To investigate

this, intrauterine growth has been studied from early pregnancy in MZ and DZ groups using ultrasound measurements of abdominal circumference, now accepted as the best single ultrasonic assessment of fetal size [5].

MATERIALS AND METHODS

The patients comprised 65 women consecutively delivered of twins between August 1984 and February 1986 in the Queen Mother's Hospital, Glasgow. All had undergone routine early pregnancy ultrasonography at their first attendance at the hospital at which gestational age was established and, with one exception, twin pregnancy diagnosed. The single twin pregnancy which remained unidentified after initial ultrasonography was diagnosed at 17 weeks during investigation of an apparently elevated maternal serum alphafetoprotein level. Mean gestational age at diagnosis was 13 weeks. Ultrasonography was repeated, in all cases, at around 17 weeks and, thereafter, at four-weekly intervals, using a realtime sector scanner. At each examination, the mean of two abdominal circumference measurements was calculated for each fetus and a total of 722 measurements thus obtained.

Zygosity was determined in 55 (85%) of the pregnancies by sex discordance or examination of the placenta and membranes or, when necessary, blood group studies including ABO, Rhesus and 12 minor red cell groups (Table 1). The total perinatally-related wastage was 10%: this includes late abortions, stillbirths, early and late neonatal deaths, and deaths in infancy from perinatal causes [12] (Table 2).

Table 1 - Determination of zygosity

Monochorionic placenta	21	25	(38%)	MZ
Dichorionic placenta: blood = MZ	4			
blood = DZ	12	30	(46%)	DZ
unlike sex	18			
Zygosity not established	10		(15%)	

Table 2 - Outcome of pregnancy by zygosity

Zygosity	N	Delivery Weeks (SD)	SGA[a] %	TPRW[b] per 1000
Monozygotic	25	35.0 (4.2)	22	140
Dizygotic	30	36.0 (3.0)	17	33
Unknown	10	35.6 (3.7)	33	200

[a]SGA: Small-for-gestational age, defined as birthweight for gestational age less than the singleton 5th percentile [11].

[b]TPRW: Total perinatally-related wastage [12].

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RESULTS

In analysing the results, measurements from one (MZ) pregnancy in which intrauterine death of one twin occurred during the second trimester, are not included. Graphic representation of mean abdominal circumference measurements in MZ and DZ pregnancies is shown (Fig. 1). Formal statistical analysis (Student's t-test) revealed no significant difference between the two groups.

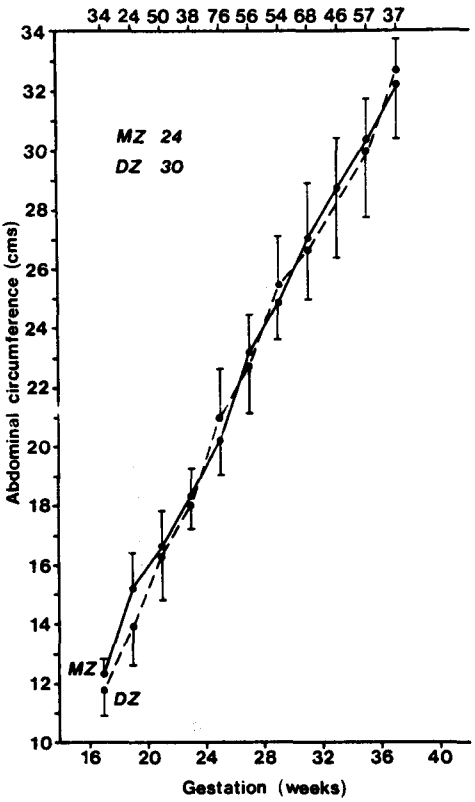

Fig. 1 - Mean abdominal circumference with one standard deviation: comparison between monozygotic (MZ) pregnancies (continuous line) and dizygotic (broken line). The figures at the top of the chart show the number of measurement obtained.

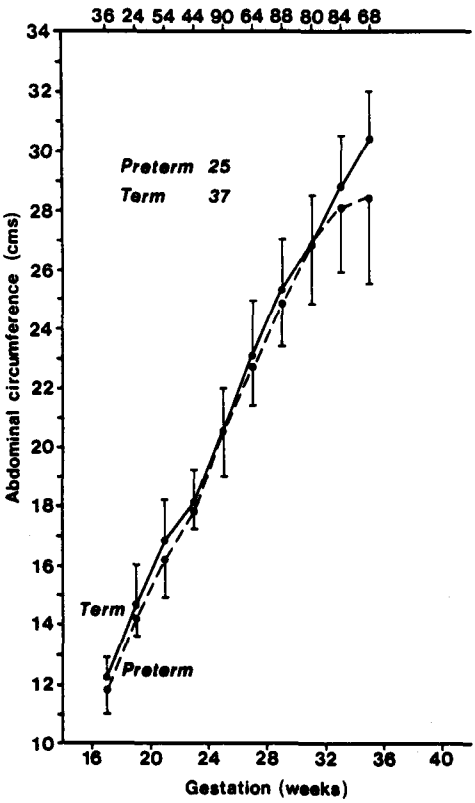

Fig. 2 - Mean abdominal circumference and one standard deviation: comparison between pregnancies resulting in delivery preterm (broken line) and at term (continuous line).

DISCUSSION

It is generally accepted that the outcome of MZ twin pregnancies is worse than that of DZ pregnancies, although a source of bias in such studies is revealed here. If intrauterine death of one twin occurs, thus making blood group studies of zygosity impossible, there is approximately an 80% chance of establishing zygosity if the pregnancy is MZ (mono-

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chorionic placenta), but only a 50% chance of establishing zygosity if it is DZ (sex discordance). This can result in an artificially lowered fetal loss rate attributed to DZ pregnancy and, as here, a particularly high loss in the "zygosity unknown" group. Of three pregnancies complicated by intrauterine death of one fetus during the second trimester, one was classified as MZ and the other two were unclassifiable.

It has been suggested that differences exist in fetal size and growth, from early gestation, between MZ and DZ pregnancies [2]. No such difference was demonstrated in the study reported here, suggesting similar growth potential in both groups. The implication of this is that application of singleton standards of SGA are appropriate in all twin pregnancies [4].

Growth of the mean abdominal circumference (Fig. 1) shows striking linearity in both MZ and DZ groups throughout pregnancy. This finding is similar to that reported by Secher and colleagues [8] from ultrasonic measurements of abdominal diameter, but is in marked contrast to the "late flettening" pattern of birthweight for gestational charts described for twins [3]. There are at least three possible explanations for this difference. Firstly, the apparent decrease in growth rate on birthweight charts during the third trimester could be due to miscalculated gestational age, now avoidable by routine early pregnancy ultrasonography [9]. If gestational age assessment in twin pregnancies relied on clinical examination there would, because of uterine enlargement, be systematic overestimation of the duration of many pregnancies which could artificially flatten the birthweight curve. The importance of this is uncertain. Secondly, if fetal growth were more likely to be impaired prior to preterm than term labour [1], this could produce a linear pattern on cross-sectional analysis of ultrasound measurements. There was, however, no evidence of a difference in growth rates when comparison was made of pregnancies resulting in preterm and in term labour, regardless of zygosity (Fig. 2). Finally, the linearity might result from an artifact associated with abdominal circumference measurement. As pregnancy advances increasing trunk flexion occurs in many twin fetuses, increasing the measured transverse abdominal dimensions and, in consequence, prediction of twins which are SGA at birth is improved by including a measure of fetal flexion along with abdominal measurements [4]. This may well explain the linear pattern.

Whilst it is suggested that the problem of fetal flexion be considered in future studies of fetal growth in twin pregnancies, this does not influence this comparison of MZ and DZ pregnancies which have been evaluated by constant technique.

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